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JOSEPH A FERNANDO

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CURATOLO SIDOTI CO., LPA  
24500 CENTER RIDGE ROAD, SUITE 280  
CLEVELAND, OH 44145

EXAMINER

LEUNG, JENNIFER A

ART UNIT

PAPER NUMBER

1797

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |  |  |
|------------------------------|--------------------------------------|--|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>09/560,469 | <b>Applicant(s)</b><br>FERNANDO ET AL. |  |
|                              | <b>Examiner</b><br>JENNIFER A. LEUNG | <b>Art Unit</b><br>1797                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 April 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2,5-13,16-27,41-44 and 47-57 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,5-13,16-27,41-44 and 47-57 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 21, 2010 has been entered.

### ***Status of the Claims***

2. Applicant's submission filed on April 21, 2010 has been considered. Claims 3, 4, 14, 15, 28-40, 45 and 46 are cancelled. Claims 1, 2, 5-13, 16-27, 41-44 and 47-57 are pending. No amendments are made to the claims.

### ***Response to Arguments***

3. Applicant's arguments have been fully considered but they are not persuasive. Applicant (at page 2, last paragraph) argues,

“The presently claimed support element comprises melt-formed and heat-treated ceramic fibers possessing certain claimed percent crystallinity and crystallite size. To begin, Robinson only discloses to use sol-gel derived fibers and does not disclose, suggest, or provide motivation to utilize melt-formed ceramic fibers to prepare a support element for an exhaust gas treatment device. Robinson discloses that suitable fibers for use in preparing a mounting mat include polycrystalline ceramic oxide fibers prepared in accordance with United States Patent No. 4,159,205 and United States Patent No. 4,277,269. These references only teach sol-gel processes preparing polycrystalline ceramic oxide fibers. The disclosed sol-gel processes involve fiberizing fibers from a solution of dissolve ceramic oxide precursor material. The Office Action does not dispute this position.”

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The Examiner respectfully disagrees and maintains that Robinson's disclosed examples of ceramic fibers formed according to a sol-gel process would not constitute a teaching away from the use of ceramic fibers formed according to alternative processes. Based on the broader disclosure, it would have been obvious for one of ordinary skill in the art to select other known ceramic fibers for forming the support element, so long as they met the requirements set forth at, e.g., column 5, lines 50-58 of Robinson et al. See also MPEP §2123 regarding rejections over the prior art's broader disclosure instead of preferred embodiments.

Applicant (at page 3, first paragraph) further argues,

“Moreover, the Office Action expressly and unequivocally concedes that Robinson does not disclose or suggest a support element for an exhaust gas treatment device containing ceramic fibers having the percent crystallinity or crystallite size as claimed in the present application. Applicants agree and further respectfully submit that Robinson does not provide any suggestion or motivation to heat-treat the ceramic fibers to provide such crystallinity and crystallite size.”

Applicant's arguments with respect to Robinson et al., taken alone, are not found persuasive. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Note that the argued ceramic fibers were taught by the secondary reference to Myles.

Applicant (at page 3, second paragraph) further argues,

“Additionally, Myles does not disclose, teach or suggest to use sol-gel fibers whatsoever, or to use melt-formed fibers in a support element for an exhaust gas treatment device, or that melt-formed fibers are a functional equivalent to sol-gel fibers.”

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Applicant's argument, however, is not found persuasive, since Myles was not relied upon to teach sol-gel fibers. In addition, the use of melt-formed fibers for forming support elements in catalytic converters would have been conventionally known in the art (as evidenced by US 5,240,269 to Langer; cited by Applicant in the IDS filed April 28, 2000). Thus, it would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute a known melt-formed ceramic fiber, as alternative to the examples of sol-gel formed fibers, for constructing the support element for holding the fragile structure in the apparatus of Robinson.

Applicant (at page 3, third paragraph to page 4, first paragraph) further argues that the Examiner's rejections are based upon improper hindsight reasoning. However, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Applicant (at page 4, second paragraph) further argues,

“Page 7 of the Office Action also attacks Applicant's claimed feature of a "sacrificial binder". The precise reason to add a sacrificial binder to the support element is to provide flexibility when handling the support element when wrapping it around a fragile catalyst support structure. Myles, on the other hand, discloses that the mat is flexible enough without binder. Consequently, one having ordinary skill in the art would not be lead to add a sacrificial binder to the mat of Myles to impart flexibility when Myles teaches an alleged adequate flexibility without binder. The Office simply cannot ignore claimed features or dismiss them as routine design changes when the cited art does not indicate the desirability of such features.”

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The Examiner respectfully disagrees and notes that this claimed feature was not “ignored”. As stated in the rejection, a sacrificial binder is specifically disclosed in the primary reference to Robinson (“The support element **20** further comprises a sacrificial binder (see column 5, lines 33-36; column 6, lines 3-26’’)). The disclosed binder facilitates the formation of the ceramic fibers into a mat structure, e.g., using conventional paper making techniques, wherein the binder comprises a sacrificial binder that is burned out of the mounting mat, leaving only the ceramic fibers in the final mounting mat product. (see column 5, lines 33-49; column 6, lines 3-46). The secondary reference to Myles was not relied upon to teach a sacrificial binder.

Applicant (at page 4, last paragraph, to page 6, first paragraph) further argues that the third reference to Sasaki teaches away from the claimed invention, since Sasaki teaches that the ceramic fibers must have a composition of 70:30 - 74:26  $\text{Al}_2\text{O}_3:\text{SiO}_2$ , which differs from the composition ranges taught by Robinson and Myles. In addition, Applicant argues that it is impermissible to “pick and choose” teachings from the Sasaki reference.

The Examiner respectfully disagrees. The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). In the instant case, the Sasaki reference was merely relied upon to provide additional support to the Robinson reference for maintaining a minimal shot content in the ceramic fibers (see Robinson: column 5, line 65 to column 6, line 1; and Sasaki: paragraph [0007]). In addition, the Sasaki reference was merely relied upon to teach the conventional

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practice of needling a support element (see paragraphs [0008], [0009]), because the needling orients some of the ceramic fibers in the vertical direction to tightly bind the support element/mat, so that the bulk density of the support element/mat is increased and separation or shifting of the layers of the support element/mat can be prevented.

Lastly, the Examiner asserts that Sasaki's teaching of a 70:30 - 74:26  $\text{Al}_2\text{O}_3\text{:SiO}_2$  ceramic fiber composition would not teach away from the ceramic fiber compositions taught by Robinson and Myles, since Sasaki's ceramic fibers were not produced according to the same time and temperature conditions of Myles. Although the composition of 70:30 - 74:26  $\text{Al}_2\text{O}_3\text{:SiO}_2$  may be mandatory for ceramic fibers produced according to the specific conditions in Sasaki, such composition would not necessarily be mandatory for ceramic fibers produced according to a different process requiring different time and temperature conditions.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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4. Claims 1, 2, 5, 6, 8-13, 16, 17, 19-27, 47-50 and 52-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Robinson et al. (US 5,580,532) in view of Myles (US 4,240,833).

Regarding claims 1, 8, 9, 12, 19-25, 47, 52, 53, 56 and 57, Robinson et al. (see FIG. 1; column 4, line 55 to column 7, line 40) discloses a device **10** comprising:

a housing **12** having an inlet **14** at one end and an outlet (not shown) at an opposite end through which exhaust gases flow; a fragile structure (i.e., monolith **18**) resiliently mounted within said housing, said fragile structure having an outer surface and an inlet end surface at one end in communication with said inlet **14** and an outlet end surface at an opposite end in communication with said outlet; and a support element (i.e., a mounting mat **20**) disposed between the housing **12** and the fragile structure **18**, said support element **20** comprising an integral, substantially non-expanding ply of polycrystalline ceramic fibers comprising about 40 weight percent to about 60 weight percent alumina and about 60 weight percent to about 40 weight percent silica (see column 5, lines 33-64). The support element **20** further comprises a sacrificial binder (see column 5, lines 33-36; column 6, lines 3-26).

The apparatus of Robinson et al. is the same as the instantly claimed apparatus, except that Robinson et al. is silent as to the ceramic fibers of the support element **20** comprising ceramic fibers which possess the physical properties of fibers that are formed according to the claimed time-temperature heating regimen.

Myles, however, teaches a ceramic fiber, suitable for forming a fiber blanket or mat to be used in a high temperature apparatus (see column 3, line 65 to column 4, line 10), wherein said ceramic fiber is melt-formed and comprises about 40 wt.% to about 60 wt.% alumina and about



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60 wt.% to about 40 wt.% silica (see column 2, lines 36-40). In particular, the ceramic fiber is prepared according to a time-temperature regimen of heating said fibers to a temperature of 990°C to at least 1050°C for greater than 1 hour, or heating said fibers to a sufficient temperature above the devitrification temperature of the fiber material for an effective amount of time to produce a microcrystalline fiber (see column 3, lines 12-64).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute the heat treated, melt formed ceramic fibers of Myles for the ceramic fibers present in the support element **20** in the apparatus of Robinson et al., on the basis of suitability for the intended use and absent a showing of unexpected results thereof, because the ceramic fibers of Myles retain sufficient flexibility and show dramatically less shrinkage under high temperature use (see column 6, lines 4-11). Furthermore, the substitution of known equivalent structures involves only ordinary skill in the art, *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958); and when the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result, *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385 (2007).

Given that the time-temperature regimen as taught by Myles is identical to or substantially identical to the time-temperature regimen being claimed by Applicants, the heat treated ceramic fibers of Myles will be identical to or substantially identical to the instantly claimed ceramic fibers having a crystallite size of greater than 200 Å to about 500 Å, and a crystallinity from about 5 to 50 percent.

And, even if the properties were not inherent, it would have been obvious for one of

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ordinary skill in the art at the time the invention was made to select the appropriate time and temperature parameters for producing a ceramic fiber having the instantly claimed physical properties of crystallinity and crystallite size in the modified apparatus of Robinson et al., on the basis of suitability for the intended use and absent a showing of unexpected results thereof, because the specific crystallinity and crystallite size are not considered to confer patentability to the claim since the precise crystallinity and crystallite size would have been considered a result effective variable by one having ordinary skill in the art (see Myles: column 3, lines 21-58). Accordingly, one having ordinary skill in the art would have routinely optimized the heating time and temperature ranges for producing a suitable crystallinity and crystallite size in the polycrystalline ceramic fibers, to obtain the desired flexibility and shrink resistance, for instance, in the support element/mat for holding the fragile structure in Robinson et al., *In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980), and where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Because the modified apparatus of Robinson et al. comprises all of the instantly claimed components, the support element will inherently exhibit the specified minimum residual pressures for holding the fragile structure within the housing after 200 cycles of testing at 900 °C or after 1000 cycles of testing at 750 °C.

Regarding claims 2, 13 and 48, Robinson et al. further discloses that the fragile structure **18** has a perimeter, at least a portion of which is integrally wrapped by the support element **20** (see FIG. 1; column 9, lines 26-30).

Regarding claims 5, 6, 16, 17, 49 and 50, Myles further teaches that the ceramic fibers

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have an average diameter ranging from about 1 micron to about 14 microns, or from about 3 microns to about 6.5 microns (see column 2, lines 50-53).

Regarding claims 10, 11, 26, 27, 54 and 55, Robinson et al. further discloses that the device may comprise a catalytic converter or a diesel particulate trap (see column 4 lines 55-62).

5. Claims 7, 18, 41-44 and 51 are rejected under 35 U.S.C. 103(a) as obvious over Robinson et al. (US 5,580,532) in view of Myles (US 4,240,833), as applied to claims 1, 9, 12 and 21, and further in view of Sasaki et al. (JP 07-286514).

Regarding claims 7, 18 and 51, Robinson discloses that the ceramic fibers should be substantially shot free, e.g., on the order of about 5 percent nominally or less (see column 5, line 65 to column 6, line 1). Sasaki et al. also teaches a ceramic fiber having a shot content of 5% by weight or less (see section [0007]). It would have been obvious for one of ordinary skill in the art at the time the invention was made to maintain a shot content of less than about 10% in the ceramic fibers forming the support element/mat in the modified apparatus of Robinson et al., on the basis of suitability for the intended use and absent a showing of unexpected results thereof, because when larger amounts of shot are present in the ceramic fiber, the specific gravity of portions of the support element/mat increases, and thermal conductivity becomes uneven, resulting in an inability to evenly hold the fragile structure, as taught by Sasaki et al.

Regarding claims 41-44, the collective teaching of Robinson and Myles is silent as to the support element/mat being needled. Sasaki teaches a support element/mat comprising ceramic fibers, in which said support element/mat is needled (see sections [0008], [0009]). It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide needling to the support element/mat in the modified apparatus of Robinson et al., on the basis of

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suitability for the intended use and absent a showing of unexpected results thereof, because the needling orients some of the ceramic fibers in the vertical direction to tightly bind the support element/mat, so that the bulk density of the support element/mat is increased and separation or shifting of the layers of the support element/mat can be prevented, as taught by Sasaki et al.

### ***Conclusion***

6. All claims are drawn to the same invention claimed in the application prior to the entry of the submission under 37 CFR 1.114 and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the application prior to entry under 37 CFR 1.114. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action after the filing of a request for continued examination and the submission under 37 CFR 1.114. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

\* \* \*

Any inquiry concerning this communication or earlier communications from the

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examiner should be directed to JENNIFER A. LEUNG whose telephone number is (571) 272-1449. The examiner can normally be reached on 9:30 am - 5:30 pm Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter D. Griffin can be reached on (571) 272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jennifer A. Leung/  
Primary Examiner, Art Unit 1797